



The City of Campbell River Carbon Neutral Plan

Claire Beckstead • Erin Welk

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About the Pembina Institute

The Pembina Institute is a national non-profit think tank that advances sustainable energy solutions through research, education, consulting and advocacy. It promotes environmental, social and economic sustainability in the public interest by developing practical solutions for communities, individuals, governments and businesses. The Pembina Institute provides policy research leadership and education on climate change, energy issues, green economics, energy efficiency and conservation, renewable energy, and environmental governance. For more information about the Pembina Institute, visit www.pembina.org or contact info@pembina.org. Our engaging monthly newsletter offers insights into the Pembina Institute's projects and activities, and highlights recent news and publications. Subscribe to Pembina eNews: <http://www.pembina.org/enews/subscribe>.



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Abbreviations

\$	Canadian dollars
CO ₂ e	Emissions with greenhouse properties equivalent to Carbon Dioxide
ekWh	energy output equivalent to one kWh
GJ	GigaJoules = 278 kilowatt-hours
GHG	Greenhouse gases
gpm	Gallons per minute
km	kilometre
kWh	kilowatt-hour
MWh	Megawatt-hour = 1,000 kWh
t	tonne = 1,000 kilograms

Executive Summary

This report provides a plan for Campbell River to move forward on energy and climate action at the corporate scale. The intention is to provide Campbell River with a solid base to take action to reduce greenhouse gases and meet the City's commitment to the BC Climate Action Charter.

The City of Campbell River has already begun to implement policies and to take actions to reduce energy use and greenhouse gas emissions from its municipal corporate operations. Significantly, in 2008 the City of Campbell River adopted the **Green City Strategy** – a Council commitment to move towards environmental sustainability. Through the planning process, citizens, stakeholders and municipal staff identified two key actions: achieve carbon neutrality in the corporate operations of the City; and develop and implement a greenhouse gas plan for the community. This plan focuses on the first action item, while the latter priority is currently being addressed through a community wide sustainability plan scheduled for completion in 2011: the Sustainable Official Community Plan & Community Energy and Emissions Plan.

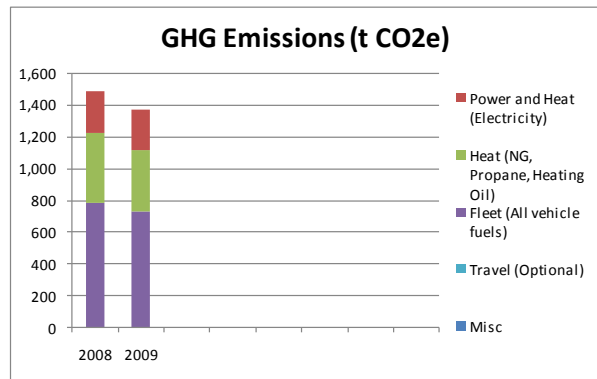
Corporate Emissions and Achieving Carbon Neutrality

As a signatory of the Climate Action Charter, Campbell River has committed to being carbon neutral in its corporate operations by 2012. Achieving carbon neutrality means that the total emissions from Campbell River's corporate operations will either be reduced through strategic actions, or offset to zero by purchasing carbon offsets.

Being carbon neutral involves four steps:

- 1) Completing annual GHG inventories to measure Campbell River's total annual corporate emissions,
- 2) Reducing emissions from Campbell River's own operations as much as possible through strategic actions,
- 3) Purchasing offsets for the emissions remaining after implementing reduction actions,
- 4) Reporting both the total annual emissions and offset purchases to the provincial government.

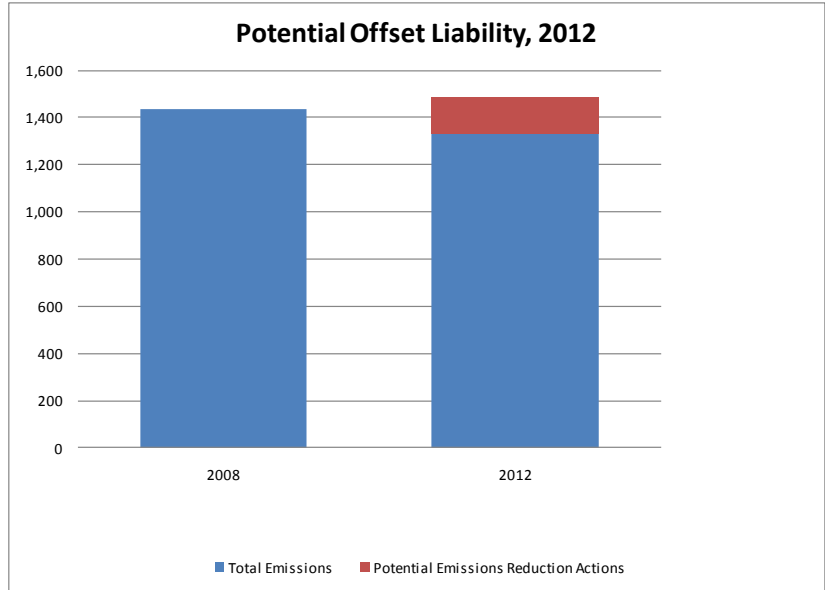
To complete the first step, Campbell River has completed two annual GHG inventories for 2008 and 2009. The chart to the left illustrates the total emissions from each year, and the change from 2008 to 2009. Two inventories are not enough to identify a trend, but it can be interesting to compare two inventories to track how emissions have changed from year to year. Overall, total emissions have decreased from 2008 to 2009 by approximately 7%. Between 2008 and 2009, emissions from buildings decreased by approximately 9% and emissions from



the fleet decreased by approximately 6%. The Green Roof project that was installed on City Hall in 2009 could potentially account for a decline in electricity use and costs during 2009. External factors such as extreme weather, including heavy snowfall in 2008, could also account for the decline in emissions.

The second step in carbon neutrality is to reduce emissions as much as possible by implementing strategic emissions reduction actions. As part of this report, Campbell River staff have brainstormed a list of potential opportunities to reduce emissions from buildings and other infrastructure, fleet and machinery, energy generation, and through purchasing policies.

The third step in achieving carbon neutrality is to purchase offsets for the emissions that cannot be reduced through strategic actions. The chart to the right illustrates Campbell River’s offset liability in 2012 if no actions are taken to reduce emissions from Campbell River’s corporate operations. Assuming a \$25 per tonne price per offsets, Campbell River’s offset liability in 2012 would be \$ 37,500 if purchased through the Pacific Carbon Trust.



This report provides a number of recommendations to consider for adoption by Council.

1. Adopt the following GHG reduction target for Campbell River’s corporate operations

Year	Target
2012	10% reduction below 2008 levels
2020	35% reduction below 2008 levels
2050	85% reduction below 2008 levels

In order to work towards achieving these targets, it is recommended that Campbell River:

2. Annually track and report on greenhouse gas emissions and initiatives to move toward carbon neutrality as required by the B.C. Climate Action Charter. We recommend that:
 - a. The annual GHG inventory is presented to all departments each year, and that each department has the opportunity to brainstorm and give input on new reduction opportunities.

- b. Progress towards meeting Campbell River's targets is communicated effectively to staff and council, and that successes and challenges are communicated appropriately to all stakeholders. Emission reduction targets for 2030 and 2040 should be set by 2015.
 - c. Campbell River coordinate with surrounding municipalities, First Nations communities, and Regional Districts to identify regional reduction opportunities, and also to negotiate how shared emissions will be reported to the province.
3. Use the Climate Action Revenue Incentive Program rebate money to establish an emissions reduction fund for municipal projects. Campbell River should explore the possibility of expanding this fund to create a stable source of funding for emission reduction activities beyond the CARIP funding.
4. Annually review, prioritize and (when feasible) implement the energy and emissions reduction actions identified in Chapter 4 as well as any new ideas identified by staff and Council.
5. Continue to implement the opportunities identified during the Green Building B.C. Opportunities Assessment of Campbell River's buildings. Comprehensive energy efficiency retrofits are in the process of being implemented in the Sportsplex, City Hall and the Enterprise Centre. Campbell River should prioritize the remaining opportunities for all buildings, and should continue to implement the identified retrofit opportunities.
6. Implement a "Green Building Policy" for new municipal facilities. Campbell River may want to explore the opportunity to require that all new buildings meet at least LEED Gold or an alternate green building standard.
7. Identify opportunities for alternative energy sources in Campbell River's new and existing municipal facilities. This will build on the work Campbell River has done identifying the opportunity for solar hot water in municipal facilities. Other technologies Campbell River could consider are, for example, geo-exchange, heat recovery, biomass, tidal, and wind.
8. Develop Campbell River's "Green Vehicle Policy". This policy should include:
 - a. Incorporating GHGs into vehicle purchasing decisions,
 - b. Investigating the opportunity to use cleaner fuels in Campbell River's fleet and machinery, including moving toward B10 or B20 biodiesel and electric vehicles as these options become viable,
 - c. Re-evaluating the anti-idling program for municipal vehicles to increase effectiveness and participation,
 - d. Implementing programs and technology for driver-training and trip-planning.
9. Create an offset purchasing policy. This policy would guide the eventual purchase of offsets to ensure that Campbell River is purchasing the highest-quality qualifying offsets.
10. Update the City's environmental purchasing policy to ensure that GHG are considered for all purchases made by the City.

11. Engage city staff in day-to-day reduction opportunities. In particular, we recommend:

- a. Implementing a staff-focused conservation program to identify behaviour-change opportunities, led by the City's Green Team.
- b. Conducting a staff survey to identify staff commuting habits and to encourage car-pooling and active modes of transportation.

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1. Introduction

1.1 Project Overview

The City of Campbell River is committed to demonstrating leadership in greenhouse gas emissions reduction, energy conservation and pursuing renewable energy, and is well suited to be a leader of action on climate change. This Carbon Neutral Plan aims to build on Campbell River's current successes in moving toward long-term sustainability and advancing Campbell River's energy planning work to be among the best in Canada.

This report provides a plan for Campbell River to move forward on energy and climate action at the corporate scale. The intention is to provide Campbell River with a solid base to take action to reduce greenhouse gases and meet the City's commitment to the BC Climate Action Charter. This report provides Campbell River with the following components to achieve this goal:

- An overview of Campbell River's current action on energy and emissions (Chapter 2)
- A Corporate Emissions Inventory, for both 2008 and 2009 (Chapter 3)
- A list of planned and potential actions at the corporate level (Chapter 4)
- A discussion of carbon neutrality and offsets (Chapter 5)
- A discussion of corporate target setting (Chapter 6)
- Recommendations for next steps (Chapter 7)

1.2 Defining Carbon Neutrality

Carbon neutrality means reducing your total greenhouse gas (GHG) emissions to zero.

Being carbon neutral involves four steps:

- 5) Completing annual GHG inventories to measure Campbell River's total annual corporate emissions,
- 6) Reducing emissions from Campbell River's own operations as much as possible through strategic actions,
- 7) Purchasing offsets for the emissions remaining after implementing reduction actions, and
- 8) Reporting both the total annual emissions and offset purchases to the provincial government.

This document explains Campbell River's strategy for making the City's carbon neutral commitment a reality, and outlines concrete actions to achieve this goal. Campbell River will strive to achieve real reductions in emissions through concrete actions; however, at least initially, it will likely be necessary to purchase offsets to achieve carbon neutrality.

1.3 B.C. Policy Context

In 2007, the provincial government passed the Greenhouse Gas Reduction Targets Act (Bill 44). This act committed B.C. to the following greenhouse gas reduction targets:

- 33% below 2007 levels by 2020, and
- 80% below 2007 level by 2050¹

As part of the broader strategy to achieve B.C.'s greenhouse gas reduction (GHG) targets, the Climate Action Charter was developed to encourage local governments to make their operations carbon neutral by 2012, to measure and report on their community's emissions, and to work toward creating more compact, complete, energy efficient communities. The Climate Action Charter was a voluntary initiative, and as of June 21, 2010, 178 local governments in B.C. signed onto the Charter. Campbell River is amongst the signatories of the Charter and is committed to being carbon neutral in its municipal operations by 2012. Making the commitment to become carbon neutral is one way of demonstrating leadership and kick-starting B.C.'s transition to a climate-friendly future.

By signing the Climate Action Charter, Campbell River is now eligible for the Climate Action Revenue Incentive Program (CARIP). Starting immediately after signing the Climate Action Charter, Campbell River is eligible to receive an annual grant equal to 100% of the carbon tax paid by Campbell River (on fossil fuel used for its municipal operations) each year.

The other piece of relevant legislation pertaining to municipal greenhouse gas emissions is the Green Communities Act (Bill 27). This act provides local governments with a variety of tools to help them reduce greenhouse gas emissions, conserve water and energy, and work towards creating more compact and sustainable communities. The amendments focus on:

- Greenhouse reduction targets in OCPs and regional growth strategies
- Development cost charge exemptions, waivers or reductions
- Expanded development permit area authority
- Flexibility related to off-street parking

Bill 27 does not have an immediate impact on corporate-level emissions, although the City's corporate-level emissions are a small component of the total community emissions inventory.

¹ Local governments are not required to adopt these same targets.

As part of the Sustainable Official Community Plan the City of Campbell River is currently developing a community-wide energy and emissions plan to address the requirements of Bill 27.

The remainder of this document will focus on Campbell River's corporate-level GHG emissions, and will outline the plan to achieve carbon neutrality.

2. Taking Stock

The City of Campbell River has already begun to implement policies and take actions to reduce energy use and greenhouse gas emissions from its municipal corporate operations. While some of these actions may have started to positively impact corporate emissions, other policies and actions will begin to show results in 2010 and beyond. Nevertheless, the actions taken to date have generated corporate momentum and offer a solid foundation from which to design and implement additional policy and action towards the ultimate goal of achieving carbon neutrality in Campbell River's municipal operations.

The policies and actions the City of Campbell River has implemented to date are summarized according to the following categories:

- Corporation Wide Strategic Plans, Programs and Policy
- Energy Efficiency and Conservation
- The City's Fleet – Vehicles
- Renewable Energy

2.1 Corporation-Wide Strategic Plans, Programs and Policy

It is important that this Carbon Neutral Plan take direction from the City's broader strategic goals and objectives, as well as offer a path for the City to reduce its corporate emissions and energy use. Taken together, these strategic plans support and provide direction for further action on climate change. For example, the City's **Corporate Strategic Plan** guides short and long-term management and decision-making. Two key areas of responsibility are fiscal sustainability and environmental sustainability, both of which support the CNP. Over time, the CNP will be further integrated into the city's corporate planning to ensure coordinated effort and action to support the City's reduction of green house gas emissions.

In 2008 the City of Campbell River adopted the **Green City Strategy** – a Council commitment to move towards environmental sustainability. As part of the strategy, the city identified five priority areas: sustainability planning, waste reduction, energy conservation and renewable energy, and environmental management and stewardship. Through the planning process, citizens, stakeholders and municipal staff identified two key actions: achieve carbon neutrality in the corporate operations of the City; and develop and implement a greenhouse gas plan for the community. This plan focuses on the first action item, while the latter priority is currently being

**City of Campbell River
Corporate Mission Statement:**

The mission of the corporation of the City of Campbell River is to deliver quality services in a fiscally responsible manner that promote prosperity and social, economic and environmental health for current and future generations.

addressed through a community wide sustainability plan scheduled for completion in 2011: the Sustainable Official Community Plan & Community Energy and Emissions Plan.

The **Corporate Green Team** includes City staff members from all departments, and works together to ensure the Green City Strategy is integrated into all city operations and services. The team has developed a Corporate Greening Strategy and initiated behaviour change initiatives such as 'lights out' and 'double sided printing' campaigns. The team works to raise awareness and develop a culture of sustainability by hosting Lunch n' Learn sessions and Sustainability 101 workshops.

In November 2008, City Council endorsed an **Environmental Purchasing Policy** that mandates environmental and sustainable evaluation on all City acquisitions. Under the policy, extended evaluation may include: end of life disposal costs, total lifecycle costs, carbon emissions, greenhouse gas emissions, impacts on human health, impacts on wildlife and percentage of recycled content. The policy offers the City the opportunity to choose to pay a premium for a sustainable product. In cases where all product descriptions and features are equivalent, the item with a lower environmental impact will be chosen.

2.2 Energy Efficiency and Conservation

The City of Campbell River has begun to investigate and implement actions to improve energy efficiency and conservation in its building operations. The following opportunity assessments have been conducted:

- The **BC Hydro Energy Management Assessment** was completed in 2009 and identifies opportunities for electricity conservation and improved energy efficiency. Results suggest the City has an opportunity to reduce electricity consumption by between 11 and 16%.
- Leemac Electric completed a **Lighting Assessment for Firehall #2** in 2009 that identified opportunities and technologies best suited for a lighting retrofit.
- In 2007, BC Hydro Power Smart conducted a **Commercial Building Survey**. This assessment was a walk-through evaluation to identify potential energy reduction measures.
- Green Buildings B.C. conducted an **Opportunity Assessment** in 2007 on 17 of the City's facilities to identify the energy and emissions reduction opportunities and lifecycle costs for retrofits to each building. In sum, the building retrofit actions were estimated to reduce the greenhouse gas emissions produced by the buildings by 17%, a total of approximately 160 tonnes of CO₂e.

The City has begun to take action and implement its opportunities for building equipment and lighting retrofits. For example, the City has started to replace its T12 lighting technology with more efficient T8 bulbs during each bulb replacement. The following actions are either completed or funded and planned for completion by 2012:

- In 2009, the City completed the installation of a **Green Roof on City Hall** – it is B.C.'s first intensive and extensive green roof retrofit to an existing civic building. The green roof consists of an extensive upper roof and a landscaped courtyard area. The increased building insulation from the vegetation layer is anticipated to reduce the need for heating and cooling by up to 25%. Total lifecycle cost savings are estimated to be \$196,000 based on 2009 dollars and electricity rates. The Green Roof retrofit is expected to double the life span of the roof from 25 to 50 years by providing a protective layer of vegetation and soil that protects the roofing membrane from the elements such as solar radiation and rain.
- In May 2010, City Council approved funding to conduct **comprehensive retrofits** in three facilities: the **Sportsplex, City Hall and Enterprise Centre**. An energy audit completed for the facilities estimates that lighting retrofits and optimization of HVAC controls in buildings can reduce greenhouse gas emissions by 26 tonnes - 13% of the total GHG emissions produced by the three buildings in 2009.
- **Blower upgrades at Norm Wood Environmental Facility** are scheduled for 2010 and are estimated to reduce energy used in the facility by 30 to 40%.

Campbell River receives a FCM Municipal Award of Excellence for its Green Roof

The Federation of Canadian Municipalities recognized Campbell River's Green Roof in the 2010 Building awards category that showcases leading municipal, environmental, energy, sustainability planning and waste reduction activities.

The Transportation Department has initiated lighting retrofit programs and assessed the opportunity for conservation through street lighting design:

- LED demonstration lights have been installed at Ken Ford boat ramp;
- There is ongoing exploration of new technology, such as Illuminex lights
- The **Adaptive Street Lighting Study** was completed at the end of 2009 and identifies the potential for the reduction of energy used by streetlights during off peak periods. The potential greenhouse gas reduction from adaptations to streetlights on local, collector and arterial roads in Campbell River is approximately 2.3 tonnes per year.

2.3 The City's Fleet – Vehicles

The City has begun to implement programs to reduce the impact of its fleet vehicles. The following activities approach the task by reducing the amount of fuel consumed through changing fuel types and improved vehicle efficiency, as well as modifying driver behaviours:

- The **Anti-Idling Policy** was endorsed by City Council in 2008 and applies to city vehicles or equipment owned, leased, rented or operated by the City. Drivers of heavy duty and light duty vehicles each have allowable warm-up and idling periods. The Green

Team has conducted departmental workshops and training in order to help city staff adopt the policy.

- The City participates in the **E-3 Fleet Program** that provides resources to help with fleet review and recommendations for upgrades and replacement vehicles. The program has helped the City identify fuel use patterns, vehicle utilization and availability, fleet emissions and best in class upgrades.
- The City is replacing light duty vehicles with hybrids on an ongoing basis. In 2009, the City began using three hybrid vehicles in its fleet and plans to purchase two more in 2010. The City plans to acquire two fully electric vehicles in 2011.
- Starting in 2010, all **diesel vehicles began using B5 fuel** (5% biodiesel content).
- The City has designated a '**carpooling parking stall**' at City Hall and is an active participant in Bike to Work Week, encouraging staff to use alternative transportation for commuting.

2.4 Renewable Energy

The City of Campbell River is demonstrating leadership in promoting solar energy. To date, the City powers 12 crosswalk signals and two radar boxes with solar technology.

Solar Hot Water Installations - The potential for solar hot water installations was assessed for five City facilities: the Sportsplex, City Hall, RCMP Station, Centennial Pool, and Fire Hall No 1. The total GHG reduction potential amounts to approximately 12.8 tonnes. The City will proceed with the installation of three demonstration projects in 2010-2011 at the Sportsplex, RCMP Station and Fire Hall No. 1. These activities are expected to produce a savings of approximately 4.3 tonnes of greenhouse gas emissions. The total cost to the City is estimated to be \$41,300, and the remaining \$11,000 in expenses is expected to be covered by grants from NRCan and Solar BC. As part of the solar hot water installations, the City will be installing an educational kiosk at the Sportsplex to promote solar hot water for homeowners and provide educational materials for local residents, schools and tourists. The City is also installing solar hot water on a new lift station that supports the sewer system.

*As one of British Columbia's **Solar Communities**, Campbell River will receive a \$5,000 grant toward promoting solar energy, access to other funding opportunities and ongoing support and training for the implementation of solar technologies.*

The City of Campbell River is currently exploring a number of other opportunities to diversify its sources of electricity and heat through the utilization of renewable energy. Currently, the City is conducting the following feasibility studies:

- A **Tidal Power Feasibility Study** is evaluating the potential for a small-scale demonstration project at Discovery Fishing Pier. The study incorporates tidal

modeling, current measurements and marine impact evaluation. The aim is for the project to generate power for lights at Discovery Pier and potentially supply some of the electricity for the Maritime Heritage Centre.

- ***Wind Feasibility Study***
- ***Feasibility Study for Heat Recovery in the Sewer System***

The City is also exploring the use of biomass, district energy systems and geo-exchange heat capture and recovery.

3. Corporate Energy Inventory

3.1 Summary of in-scope activities

The first step in achieving carbon neutrality is to complete annual GHG inventories. In order to complete a GHG inventory, it is first important to understand what activities are in and out of scope. The Ministry of Community and Rural Development (MCRD) has outlined a specific scope for local governments for completing their annual GHG inventory. The MCRD scope standardizes what activities are in-scope for carbon neutral inventory reporting for all local governments in BC. Figure 1 outlines all activities that are in-scope for the annual carbon neutral GHG inventories.

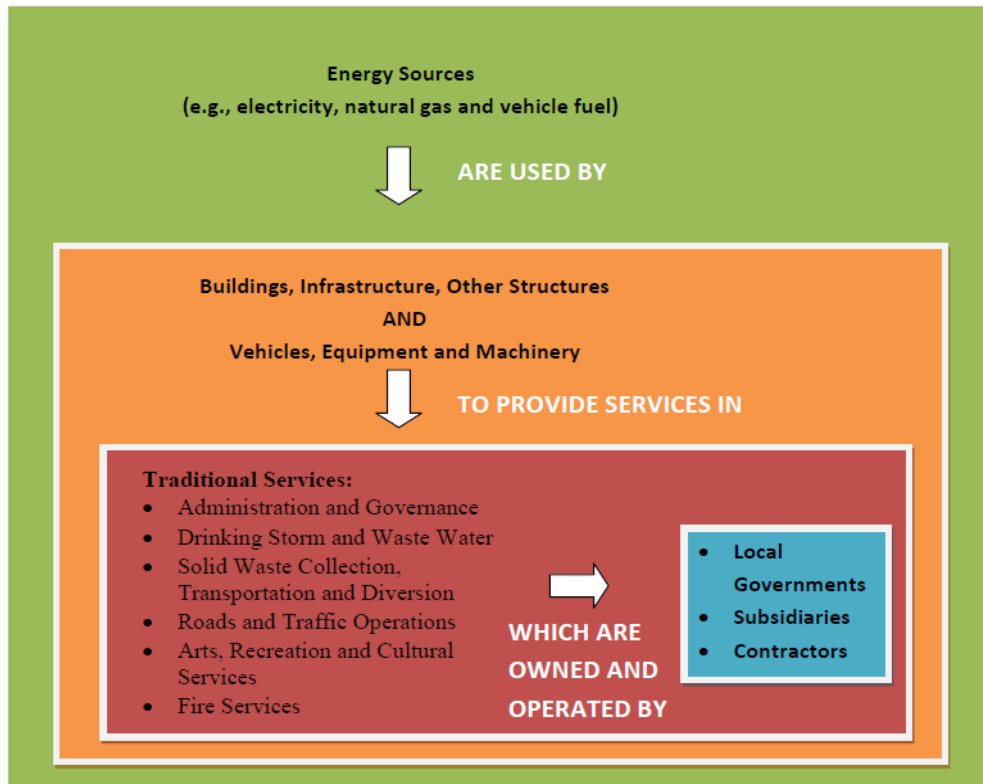


Figure 1 - Activities in-scope for annual carbon neutral GHG inventories

MCRD has subdivided the local government’s energy use into two categories: Buildings, Infrastructure and Other Structures; and Vehicles, Equipment and Machinery. Any energy used

in either of these two categories that produces GHGs is included in a local government's annual GHG inventory.

MCRD has also identified six Traditional Service areas that define the in-scope activities for carbon neutral reporting. The six Traditional Services are:

- Administration and Governance
- Drinking, Storm and Waste Water
- Solid Waste Collection
- Roads and Traffic Operations
- Art, Recreation and Cultural Services
- Fire Services

Any service provided by BC local governments that fall within these six categories are considered in-scope for carbon neutrality.

There are specific activities that are excluded from municipal corporate inventories. Specifically, emissions from the following sources are excluded:

- Landfill
- Transit services
- Police services
- New construction (facilities, roads, etc.)
- Primary power generation
- Social housing
- Tree farms
- Community sources (e.g., residential or commercial emissions)

Given these exemptions, as an example, the Highway 19A new construction project in Campbell River would not be included in Campbell River's inventory. As well, the operations of the Campbell River Airport are also out of scope.

The inventory must also include all activities that are owned and operated by the local government, contractors and subsidiaries of the local government. In other words, if an activity or service falls into one of the six Traditional Services categories outlined by MCRD, and it is not one of the eight specific exemptions, even if the service is performed by a contractor or a subsidiary of the local government, it must be included in the inventory. This information will be obtained directly from the contractors and subsidiaries for inclusion in the inventory.

Please see Appendix 2 for MCRD's summary of both in and out of scope activities.

The results of the 2008 and 2009 inventories will now be presented.

3.2 Corporate Energy and Emissions Inventories

The City of Campbell River has completed their 2008 and 2009 Corporate Greenhouse Gas (GHG) inventory using the Pembina Cool Tool.² Campbell River staff participated in the Pembina Cool Tool workshops, and now have the ability to complete annual GHG inventories in-house. Data to complete the 2008 and 2009 inventory were collected from BC Hydro and Terasen Gas bills, and from fuel consumption records. Information from Campbell River contractors was also required to complete the Cool Tool Inventory.³ The GHG inventory results provide a snapshot of energy consumption, the associated costs, and greenhouse gas emissions for the corporate operations of the City of Campbell River in 2008 and 2009. Campbell River is now able to continue to complete annual GHG inventories with the Pembina Cool Tool.

It is important to note that greenhouse gas emission intensity factors vary for each energy source. This means that for each unit of energy produced, different fuels emit a different amount of greenhouse gas emissions. In B.C., electricity is primarily produced from hydro power, and therefore produces fewer GHGs than if B.C. electricity came from a dirtier source such as coal. Per unit of energy consumed, electricity in B.C. also produces fewer GHGs than a fuel type such as natural gas. Figure 1 illustrates the GHG intensities of different fuels.

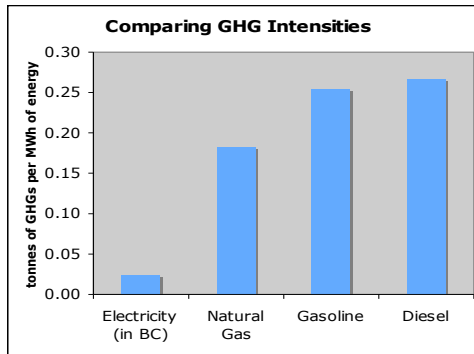


Figure 2 - Comparing GHG Intensities for Different Fuel Types in B.C.

3.2.1 2008 Inventory

In 2008, Campbell River's total corporate energy consumption was 53,701 GJ. This translated to 1,484 tonnes of CO₂e. The total cost for energy was \$1,058,261. Table 1 shows the breakdown of energy consumption, energy costs, and greenhouse gas emissions for both

² Please see Appendix 1 – Completing an Annual Cool Tool Inventory for additional details on completing a Cool Tool inventory.

³ Contracted services information is more difficult to obtain as this information needs to be tracked and reported by the various contractors. As Campbell River becomes improves this data collection, the contracted services portion of the 2008 and 2009 inventories may be adjusted as appropriate.

buildings and fleet in 2008. Note that the Cool Tool converts all energy consumption to GJ; the results include all energy sources, including both electricity and vehicle fuel.

Table 1 - GHG Inventory Summary (2008)

Inventory Summary Table

	GHG Emissions (t CO ₂ e)	Energy Use (GJ)	Cost (\$ CDN)
Power and Heat (Electricity)	261	33,581	735,047
Heat (Natural Gas, Propane, Fuel Oil)	440	8,853	125,498
Fleet (All vehicle fuel)	783	11,268	197,715
Travel (Optional)	0	0	0
Miscellaneous	0	n/a	n/a
Total	1,484	53,701	1,058,261

Figure 3 below shows what percentage of total energy use, greenhouse gas emissions and cost are attributed to buildings (electricity, natural gas and propane), and what percentage is attributed to the vehicle fleet (gasoline and diesel).

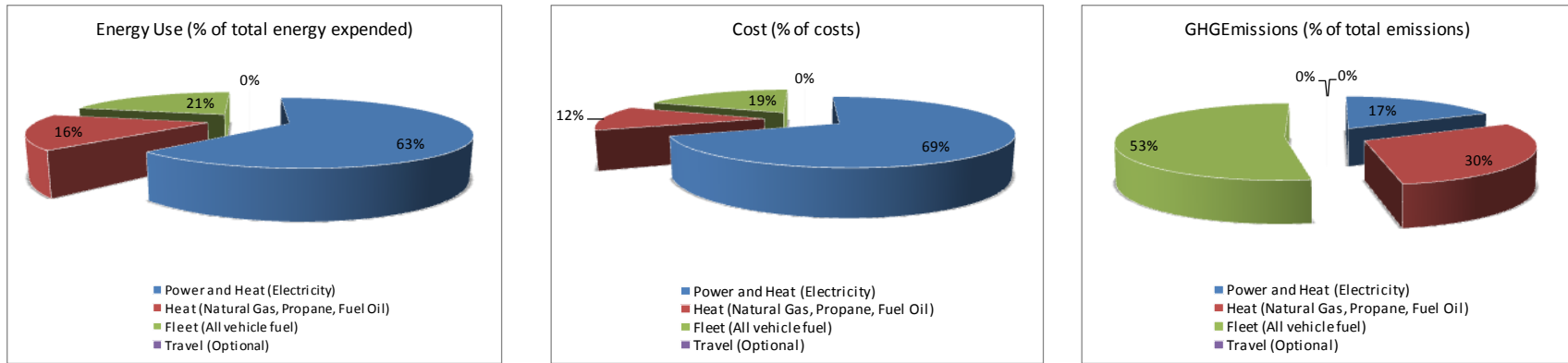


Figure 3 - Total Energy Use, Cost and GHG Emissions for Corporate Operations (2008)

In 2008, Power and Heat (Electricity) in municipal buildings accounts for 63% of total energy use and 69% of total cost, but only 17% of total GHG emissions. In contrast, heat (Natural Gas, Propane and Fuel Oil) in municipal buildings accounts for 16% of energy use and 12% of total cost, and accounts for 30% of total GHG emissions. Similarly, the vehicle fleet accounts for 21% of total energy use and 19% of total cost, but accounts for 53% of total GHG emissions. This reflects the fact that natural gas, propane, diesel and gasoline have higher GHG emissions factors than electricity.

The Cool Tool also disaggregates the data into the Traditional Services (as defined by the Ministry of Community and Rural Development - MCRD) and into municipal and contracted services. The Traditional Services as defined by the MCRD are: Administration and Governance; Roads and Transportation; Solid Waste; Arts, Recreation, Parks and Cultural Services; and Water and Waste Water. Campbell River elected to disaggregate the Water and Waste Water category into two separate categories. Figure 4 illustrates the percentage of emissions from each Traditional Service. In 2008, 1,173 tonnes of CO₂e are attributed to municipally-owned facilities and fleet, which is 79% of the total emissions. Contracted services account for 311 tonnes of CO₂e, or 21%. The information to quantify the contracted services is more difficult to obtain as it needs to be provided by each individual contractor. As mentioned, contractor information is difficult to obtain, and both the information itself and the process for collection will be refined going forward. This component of the 2008 and 2009 inventories may be amended as better information is obtained from the contractors. Figure 5 illustrates the Traditional Services breakdown, and Figure 5 illustrates the Contracted Service breakdown.

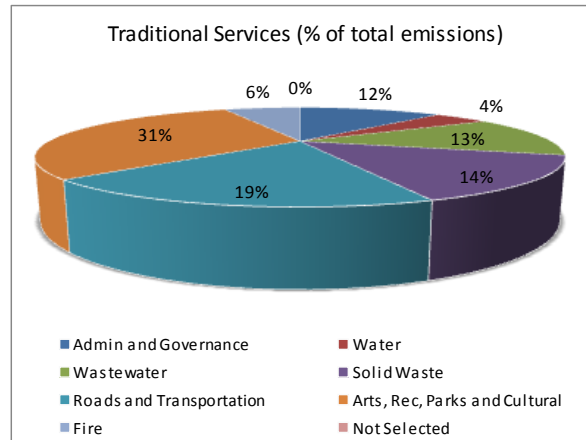


Figure 4 - Total Emissions by Traditional Services (2008)

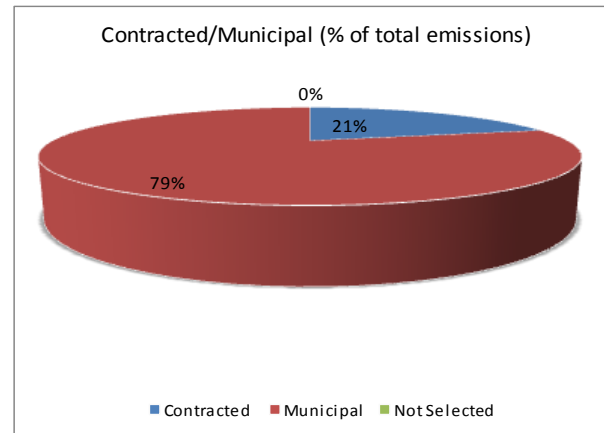


Figure 5 - Total Emissions by Contracted Services (2008)

3.2.2 2009 Inventory

The 2009 inventory is similar to the 2008 inventory. In 2009, Campbell River’s total corporate energy consumption was 51,165 GJ. This translated to 1,373 tonnes of CO₂e. The total cost for energy was \$1,006,452. Table 2 shows the breakdown of energy consumption, energy costs, and greenhouse gas emissions for both buildings and fleet in 2009.

Table 2 - GHG Inventory Summary (2009)

Inventory Summary Table

	GHG Emissions (t CO ₂ e)	Energy Use (GJ)	Cost (\$ CDN)
Power and Heat (Electricity)	256	32,900	763,684
Heat (Natural Gas, Propane, Fuel Oil)	384	7,724	119,294
Fleet (All vehicle fuel)	733	10,541	123,474
Travel (Optional)	0	0	0
Miscellaneous	0	n/a	n/a
Total	1,373	51,165	1,006,452

Figure 6 below shows what percentage of total energy use, greenhouse gas emissions and cost are attributed to buildings (electricity, natural gas and propane), and what percentage is attributed to the vehicle fleet (gasoline and diesel).

Corporate Energy Inventory

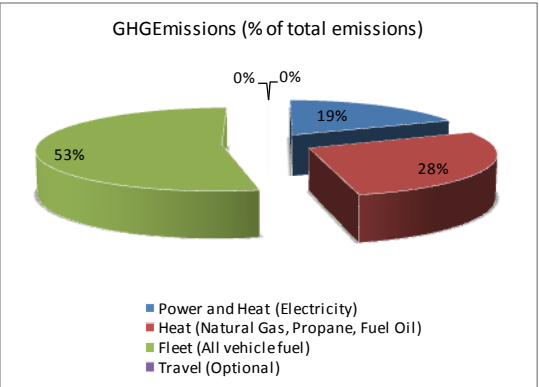
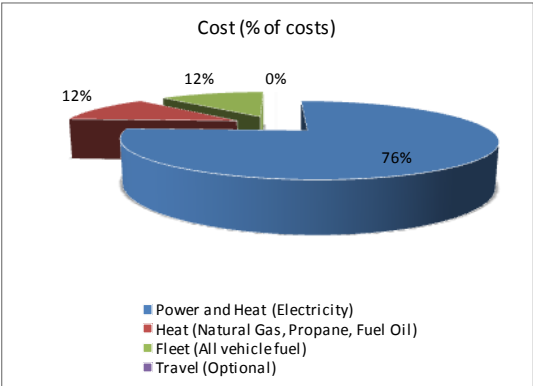
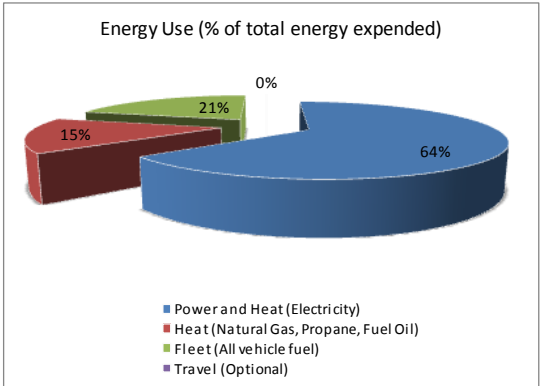


Figure 6 - Total Energy Use, Cost, and GHG Emissions for Corporate Operations (2009)

In 2009, 1,065 tonnes of CO₂e are attributed to municipally-owned facilities and fleet, which is 78% of the total emissions. Contracted services account for 309 tonnes of CO₂e, or 22%. Similar to the 2008 inventory, the contractor information for 2009 may not be 100% complete and may be amended as better information is collected. Figure 7 illustrates the Traditional Services breakdown, and Figure 8 illustrates the Contracted Service breakdown.

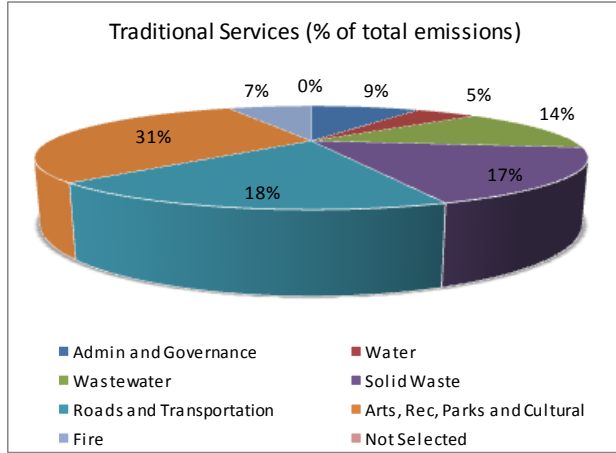


Figure 7 - Total Emissions by Traditional Services (2009)

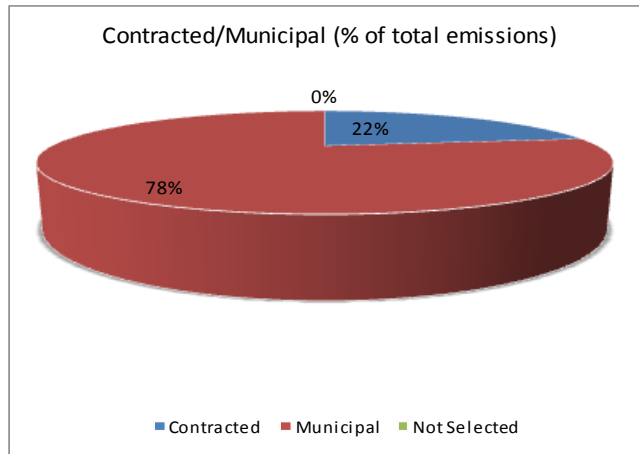


Figure 8 - Total Emissions by Contracted Services (2009)

3.3 Comparing the 2008 and 2009 Inventories

Part of the utility of completing annual inventories is the ability to compare the change in energy use, cost of GHG emissions over time. Since Campbell River is committed to carbon neutrality (i.e. net corporate emissions of zero), ideally, Campbell River’s emissions will decline year after year.

There are a variety of factors that can affect emissions from year to year. Some examples of factors that can cause fluctuation are factors such as weather (e.g., unusual temperatures or precipitation), population growth or decline, and adding or removing facilities. Therefore, it is normal to see some fluctuation in energy use, cost and emissions from year to year. It is recommended to complete a minimum of five annual inventories before identifying a trend in the change of total energy use, cost or GHG emissions.

However, it can be interesting to compare two inventories to track how emissions have changed from year to year. Overall, total emissions have decreased from 2008 to 2009 by approximately 7%. Emissions from buildings decreased by approximately 9% and emissions from the fleet decreased by approximately 6% between 2008 and 2009.

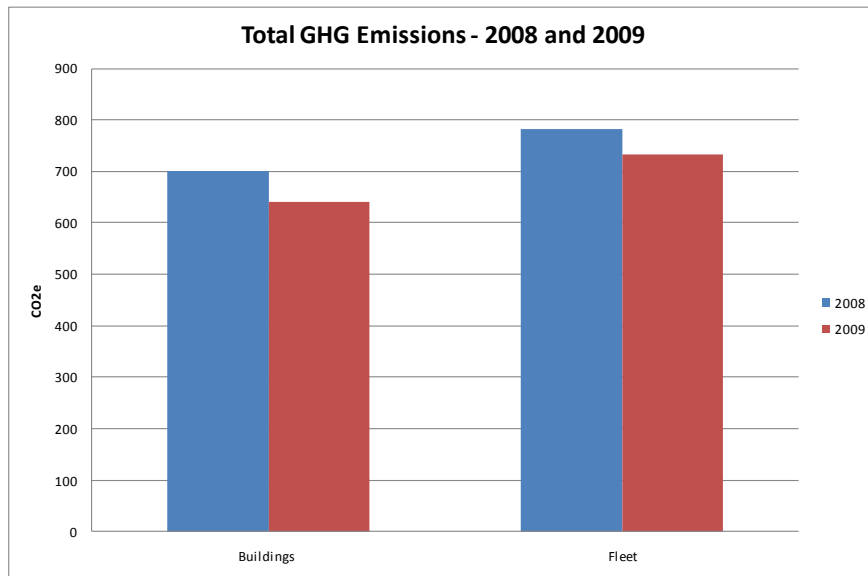


Figure 9 - Total GHG Emissions - 2008 and 2009

Figure 10 below illustrates how GHG emissions (by energy type) have changed. Electricity consumption has declined by 2%, natural gas and propane for heating has declined by 13%, and fleet fuel consumption has declined by 6%.

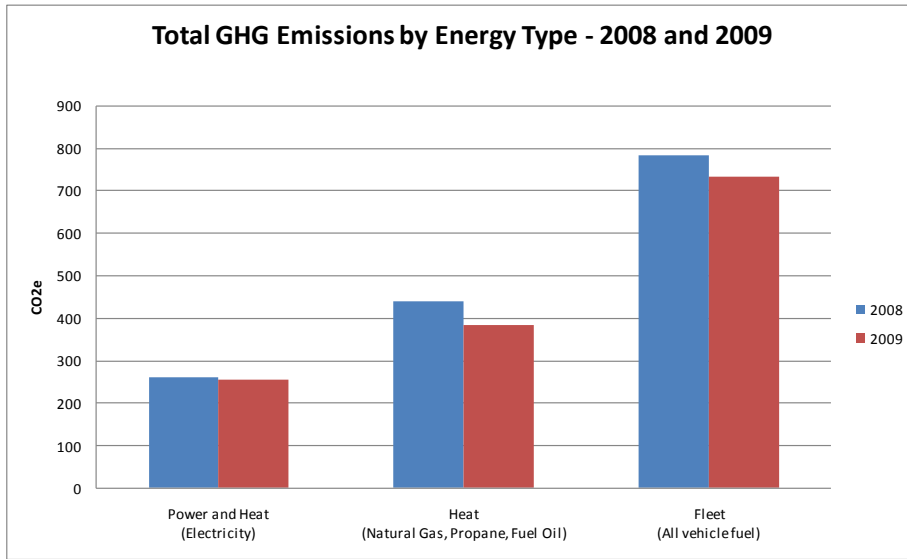


Figure 10 - Total GHG Emissions by Energy Type - 2008 and 2009

Figure 11 illustrates the change in emissions from 2008 to 2009 by Traditional Service. It is important to note that the Traditional Services are a reflection of the inventory scope as defined by the Ministry of Community and Rural Development; it does not align perfectly with Campbell River’s internal departments.

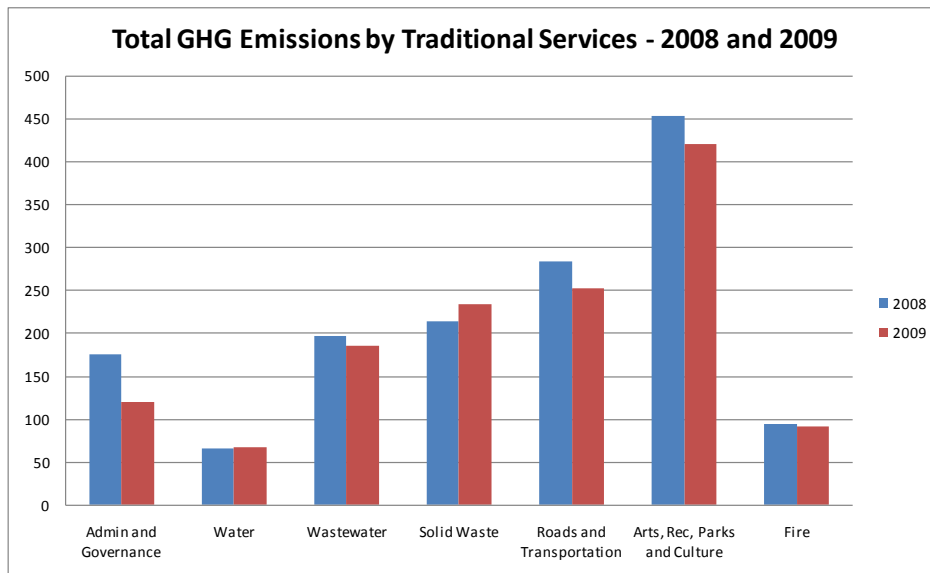


Figure 11 - Total GHG Emissions by Traditional Services - 2008 and 2009

Emissions have declined from 2008 to 2009 in Administration and Governance (32% decline); Wastewater (6% decline); Roads and Transportation (11% decline); Arts, Rec, Parks and Culture (7% decline); and Fire (2% decline). Conversely, emissions have increased in two Traditional Services: Water (1% increase) and Solid Waste (10% increase).⁴

As mentioned previously, there are a variety of reasons why there would be a decline in emissions from 2008 to 2009. The Green Roof project that was installed on City Hall in 2009 could potentially account for a decline in electricity costs during 2009. A decline in electricity consumption would not explain a large decline in overall GHG emissions. Therefore, external factors such as extreme weather, including heavy snowfall in 2008, could account for the decline in emissions.

⁴ The 2008 and 2009 inventories include the contribution of emissions from sewer and water services provided to neighbouring First Nations and to the Regional District. These services provided account for about approximately 7% of total emissions for sewer and water. It will be important to negotiate with the Regional District to determine how these emissions will be reported to the province. First Nations communities are not required to report emissions to the province.

4. Action Planning

The second step in achieving carbon neutrality is to reduce total GHG emissions as much as possible by identifying and implementing emissions reduction projects and strategies. During the Cool Tool workshop series, Campbell River staff brainstormed a list of planned and potential emission reduction actions for corporate-level emissions. Staff from the Corporate Green Team; General Managers from Operations, Finance, and Facilities and Supply Management; and staff from the Sustainability Department, Transportation, Utilities, Fleet, and Facilities were involved in creating this plan. For these actions, we identified those that have a measurable GHG reduction potential and have provided some high level estimates of the potential for these emission reductions. These estimates were used to assist in the target setting exercise during Cool Tool Workshop 3 (See Chapter 6).

Please see the list below for the list of brainstormed emission reduction activities. The ideas listed here have not been evaluated or prioritized. Chapter 7 will outline the recommended next steps for these activities.

4.1 Buildings and other Infrastructure

The ideas brainstormed here are potential opportunities to reduce the electricity and natural gas needed to heat and power Campbell River’s municipal buildings.

Table 3 - Potential Reduction Opportunities (Buildings and Other Infrastructure)

Buildings and other Infrastructure (Electricity and Natural Gas)
Implement BC Hydro Energy Audits and Energy Efficiency Retrofits all municipal buildings (e.g., lighting upgrades and HVAC optimizations)
Optimize UV dose in water treatment
Optimize water stations to reduce pumping and water consumption (e.g., use gravity)
Install pressure reducing valves for water system
Use turbines to produce electricity to run water turbines rather than the grid
Install a biodiesel generator in the water system
Install remote monitoring for utilities and sewer system
Reduce air-conditioning use through system optimization (i.e., HVAC programming) and behaviour change

Evaluate the potential life-cycle costs of using battery powered hand tools
Upgrade the Norm Woods Environmental centre blowers
Implement a LEED standard for replacement or new construction of municipal facilities
Install motion detectors for lighting at the Firehall
Improve energy efficiency in all buildings through behaviour change strategies
Install Illuminex lighting for street lighting
Investigate the potential of a community-wide kitchen waste collection to reduce waste vehicle emissions
Investigate switching back to heating the Firehalls with electricity instead of natural gas

4.2 Fleet and Machinery (Gasoline and Diesel)

The ideas brainstormed here are potential opportunities to reduce gasoline and diesel consumption in Campbell River’s fleet and in Campbell River’s machinery.

Table 4 - Potential Reduction Opportunities (Fleet and Machinery)

Fleet and Machinery (Gasoline and Diesel)
Begin route and trip planning (potentially with the use of GPS) with maintenance and road crews
Investigate the use of anti-idling devices for automatic vehicle shut-down
Optimize routes for delivery of supplies
Develop a municipal vehicle-use policy
Continue fleet upgrade policy to transition fleet to electric vehicles and install electric vehicle docking stations
Use ethanol blend gasoline in fleet vehicles
Use biodiesel in fleet vehicles (up to B10 – B20)
Require that municipal contractors use a minimum of 5% biodiesel blend in diesel vehicles
Implement a biodiesel station in town for municipal use
Use split trucks for waste and recycling collection
Optimize scheduling of waste collection for reduced trip length and reduced number of trips
Install aftermarket diesel DPF filters

4.3 Energy Generation

The ideas brainstormed here are potential opportunities for alternative energy generation in Campbell River.

Table 5 - Potential Reduction Opportunities (Energy Generation)

Energy Generation
Investigate the potential for a district energy system
Prioritize municipal buildings for alternative energy generation (i.e., identify the municipal building with the most potential)
Investigate alternative heat generation technologies (i.e., geoexchange or air source heat pumps)
Install a building-scale wind turbine on a municipal facility
Install solar lighting on street lights

4.4 Purchasing Policies

The ideas brainstormed here are potential ideas for new purchasing policies in Campbell River. These ideas will not necessarily reduce energy consumption and greenhouse gases in the corporate inventory. However, these ideas may have other positive effects such as local economic development.

Table 6 - Potential Reduction Opportunities (Purchasing Policies)

Purchasing Policies
Implement the “wood first” policy to favour local wood
Implement a “local food” policy for municipal food for City-run events

5. Carbon Neutrality and Offsets

Carbon neutrality means reducing total greenhouse gas (GHG) emissions to zero.

Being carbon neutral involves four things:

- 1) Completing annual GHG inventories to measure Campbell River's total annual corporate emissions,
- 2) Reducing emissions from Campbell River's own operations as much as possible through strategic actions,
- 3) Purchasing offsets for the emissions remaining after implementing reduction actions, and
- 4) Reporting both the total annual emissions and offset purchases to the provincial government.

Chapter 3 outlined Campbell River's plan to complete the annual inventories, and Chapter 4 outlined the potential opportunities for reducing Campbell River's emissions through strategic actions. This Chapter will outline the options for purchasing offsets to achieve carbon neutrality.

5.1 What is an Offset?

A carbon offset is a market-based mechanism for putting a price on a tonne of GHG emissions. Any project that meets qualifying criteria that has the ability to reduce GHG emissions can sell this reduction to governments, businesses, or individuals that are not able to reduce their own emissions. By paying for the offset, the purchaser has the right to count the emissions reduction made by the project as though they had made the reduction themselves. The offset project is made viable by the offset purchase.

The Pacific Carbon Trust (PCT) is a provincial crown corporation that has been established to acquire high quality carbon offsets (i.e., projects that are proven to reduce emissions) to help the public sector become carbon neutral by 2010. All offsets that are purchased by the PCT must be compliant with the BC Emission Offsets Regulation, which is based on the ISO 14064-2 standard. Individuals, businesses and local governments can also purchase offsets from the Pacific Carbon Trust, but are not be required to do so. Currently, offsets cost \$25 per tonne through the PCT.

Local governments will also be able to purchase offsets from the Pacific Carbon Trust, but will not be required to do so. No matter where a local government buys offsets from, it is important to ensure that the offsets are high quality.

5.2 Achieving Carbon Neutrality by Purchasing Offsets

Campbell River is committed to be carbon neutral by 2012. This means that Campbell River will need to reduce its total emissions to zero, or, purchase offsets to reduce the total emissions to zero. Ideally, Campbell River would achieve carbon neutrality by implementing emission reduction opportunities alone. However, at least initially, Campbell River will likely have to purchase offsets to achieve carbon neutrality. Over time, emissions reduction opportunities will continue to be identified, so that Campbell River's reliance on offsets will decrease. Figure 12 illustrates Campbell River's projected emissions in 2012.⁵

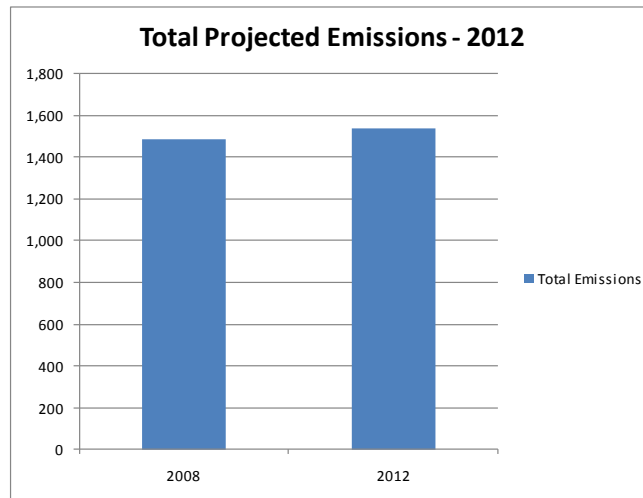


Figure 12 - Total Projected Emissions - 2012

If no emissions reduction actions are implemented between now and 2012, Campbell River will be required to offset approximately 1,500 tonnes of CO₂e in 2012. Assuming a \$25 per tonne price of carbon offsets, Campbell River's offset liability in 2012 will be approximately \$37,500. Campbell River will be required to purchase offsets every year after 2012 to achieve carbon neutrality. The price-per-tonne to purchase a carbon offset is uncertain, and it is possible that the price will increase over time to be much higher than \$25 per tonne.

⁵ This projection assumes that Campbell River's corporate emissions will grow at the same rate as population growth in Campbell River. According to Statistics Canada, Campbell River's population grew by almost 1% per year (0.92%). The actual growth in emissions may be faster or slower.

Any successfully-implemented emissions reduction actions will reduce Campbell River's offset liability. As will be described in more detail in Chapter 5, Campbell River has identified enough planned reduction opportunities to reduce this offset liability by approximately 7% by 2012. If all of these reduction projects are successfully implemented, this will mean that Campbell River's offset liability will be reduced by approximately 150 tonnes, saving Campbell River almost \$4,000 in offset purchases per year.

Additionally, by investing in emissions reduction activities locally, rather than purchasing offsets, Campbell River is keeping this investment in the community.

5.3 Selling Offsets

Given that in an offset trading-system the reduction of a carbon emission has a monetary value, some local governments in B.C. have started to consider the possibility of selling carbon offsets as a source of revenue. This is technically a possibility in B.C.; however, there are several key considerations that need to be taken into account:

1. Local governments that have committed to carbon neutrality in their operations cannot claim offset projects related to their operations and sell the reductions to the PCT. If a local government were to sell the emissions reductions from a project that reduced emissions from corporate operations, the local government could no longer claim that reduction in their own inventory. This means that their own corporate emissions inventory would *increase* by the same amount as the carbon offsets sold. To achieve carbon neutrality, the local government would then need to turn around and *purchase* offsets to reduce their own emissions to zero. Financially, this would likely cost the local government more than if they had just counted their own emissions reductions.
2. Verification of offsets is very time consuming and expensive. If a local government were to develop an offset project, in order to sell the offsets either on the voluntary market or to the PCT, the project would need to be verified by a third-party evaluator. This process is time consuming and expensive and likely would make any project financially non-viable.
3. By selling an offset, Campbell River would take on the liability for ensuring the offset is reducing the claimed emissions reductions.

Given that Campbell River has committed to carbon neutrality, at least in the short-term, financially it makes most sense for Campbell River to focus its resources on reducing its own emissions rather than developing offset projects to sell.

6. Corporate Target Setting

The Climate Action Charter is a voluntary charter that was initiated in 2007. Campbell River is a signatory of the charter, and is therefore required to be carbon neutral in its municipal operations by 2012, to measure and report on their community's emissions, and to work toward creating more compact, complete, energy efficient communities. Carbon neutrality means reducing Campbell River's net corporate emissions to zero. This will be achieved by implementing emissions reduction activities to reduce actual emissions, and then purchasing offsets for emissions that Campbell River is unable to reduce. Although Campbell River's official target is to be carbon neutral (i.e., emissions reduced to zero), setting internal targets helps ensure that corporate emissions are on a downward trajectory, and helps measure progress in minimizing emissions (and offset purchases) as much as possible.

City of Campbell River staff from Operations, Facilities and Supply Management and the Finance Division participated in a workshop to identify realistic targets for reducing emissions at the corporate scale. Example actions were quantified based on Campbell River's 2008 inventory to identify the order of magnitude reductions that could be expected. Please see Appendix 3 – Action Planning Assumptions for the assumptions underlying these estimates. Campbell River's 2008 inventory will be used as the baseline year to measure progress in reducing emissions and the progress to meet the reduction targets.

Figure 13 illustrates the potential reductions that could be expected from key actions. The example actions are not intended to imply that these actions have been prioritized as the actions to implement. Instead, the examples are simply illustrative of the order-of-magnitude reductions that could be expected from certain kinds of actions.

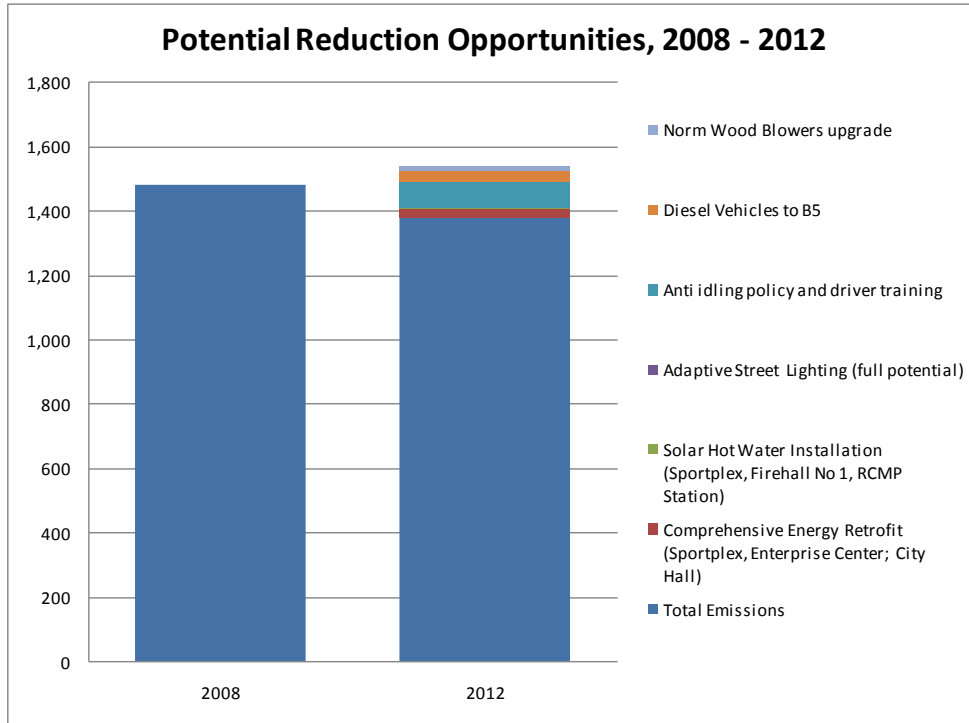


Figure 13 - Potential Reduction Opportunities, 2008 - 2012

If all actions identified in Figure 13 were implemented, Campbell River could expect to see a 7% reduction in corporate emissions from 2008 to 2012. This assumes that Campbell River’s emissions grow by approximately 0.9% per year, which is equal to the city’s growth rate from the last census. This growth assumption does not take into account unpredictable events such as extreme weather events or the unscheduled destruction of a facility.

It is also important to consider the medium-and-long-term timeframe when setting targets. Figure 14 illustrates the reduction potential if all activities identified were implemented on a longer timeframe – out to 2020 instead of 2012. Again, this list does not imply that these activities have been prioritized. Instead, this simply illustrates the order-of-magnitude reductions that could expect from certain kinds of activities. If all reduction opportunities were implemented by 2020, Campbell River could expect to see a 24% reduction in emissions from 2008 levels.

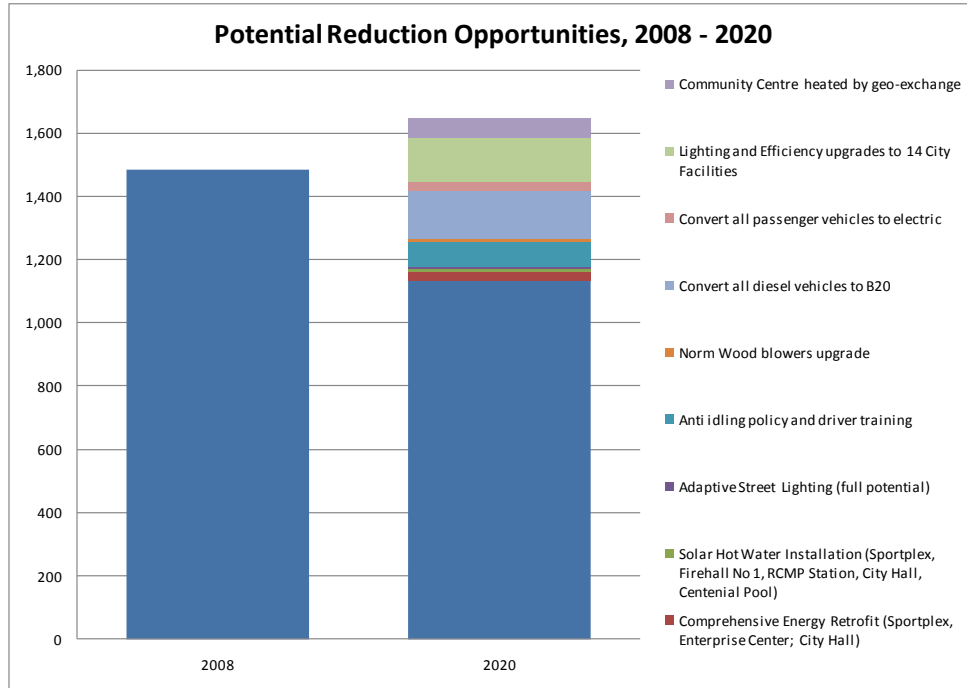


Figure 14 - Potential Reduction Opportunities, 2008 - 2020

The intended outcome of the Corporate Target Setting Workshop was to identify internal emissions reduction targets at the corporate scale.

The targets for Campbell River agreed upon at the workshop are as follows:

- 10% reduction in emissions below 2008 levels by 2012
- 35% reduction in GHG emissions below 2008 levels by 2020
- 85% reduction in GHG emissions below 2008 levels by 2050

Campbell River is confident that it will be possible to identify enough additional reduction opportunities to achieve these targets. The targets are aggressive, but achievable. To our knowledge, the corporate targets that Campbell River has selected are amongst the most aggressive municipal targets in the province.

7. Recommendations

This report provides a number of recommendations to consider for adoption by Council.

1. Adopt the following GHG reduction target for Campbell River’s corporate operations

Year	Target
2012	10% reduction below 2008 levels
2020	35% reduction below 2008 levels
2050	85% reduction below 2008 levels

In order to work towards achieving these targets, it is recommended that Campbell River:

2. Annually track and report on greenhouse gas emissions and initiatives to move toward carbon neutrality as required by the B.C. Climate Action Charter. We recommend that:
 - a. The annual GHG inventory is presented to all departments each year, and that each department has the opportunity to brainstorm and give input on new reduction opportunities.
 - b. Progress towards meeting Campbell River’s targets is communicated effectively to staff and council, and that successes and challenges are communicated appropriately to all stakeholders. Emission reduction targets for 2030 and 2040 should be set by 2015.
 - c. Campbell River coordinate with surrounding municipalities, First Nations communities, and Regional Districts to identify regional reduction opportunities, and also to negotiate how shared emissions will be reported to the province.
3. Use the Climate Action Revenue Incentive Program rebate money to establish an emissions reduction fund for municipal projects. Campbell River should explore the possibility of expanding this fund to create a stable source of funding for emission reduction activities beyond the CARIP funding.
4. Annually review, prioritize and (when feasible) implement the energy and emissions reduction actions identified in Chapter 4 as well as any new ideas identified by staff and Council.
5. Continue to implement the opportunities identified during the Green Building B.C. Opportunities assessment of Campbell River’s buildings. Comprehensive energy efficiency retrofits are in the process of being implemented in the Sportsplex, City Hall and the

- Enterprise Centre. Campbell River should prioritize the remaining opportunities for all buildings, and should continue to implement the identified retrofit opportunities.
6. Implement a “Green Building Policy” for new municipal facilities. Campbell River may want to explore the opportunity to require that all new buildings meet at least LEED Gold or an alternate green building standard.
 7. Identify opportunities for alternative energy sources in Campbell River’s new and existing municipal facilities. This will build on the work Campbell River has done identifying the opportunity for solar hot water in municipal facilities. Other technologies Campbell River could consider are, for example, geo-exchange, heat recovery, biomass, tidal, and wind.
 8. Develop Campbell River’s “Green Vehicle Policy”. This policy should include:
 - a. Incorporating GHGs into vehicle purchasing decisions,
 - b. Investigating the opportunity to use cleaner fuels in Campbell River’s fleet and machinery, including moving toward B10 or B20 biodiesel and electric vehicles as these options become viable,
 - c. Re-evaluating the anti-idling program for municipal vehicles to increase effectiveness and participation,
 - d. Implementing programs and technology for driver-training and trip-planning.
 9. Create an offset purchasing policy. This policy would guide the eventual purchase of offsets to ensure that Campbell River is purchasing the highest-quality qualifying offsets.
 10. Update the City’s environmental purchasing policy to ensure that GHG are considered for all purchases made by the City.
 11. Engage city staff in day-to-day reduction opportunities. In particular, we recommend:
 - a. Implementing a staff-focused conservation program to identify behaviour-change opportunities, led by the City’s Green Team.
 - b. Conducting a staff survey to identify staff commuting habits and to encourage car-pooling and active modes of transportation.

8. Appendices

8.1 Appendix 1 – Completing an Annual Cool Tool Inventory

The Cool Tool is an excel-based inventory tool designed specifically for B.C. municipalities to assist in completing annual GHG inventories. The information below is intended as a reference to assist in completing the inventories.

8.1.1 1.0 Information Required to Input into the Cool Tool

	Required Data	Recommended Sources of Information
Electricity	Electricity use (kWh)	Monthly electricity bills, e.g. BC Hydro or Fortis BC billing
Heat	Fuel use (GJ, litres, m3)	Monthly heating bills, e.g. Terasen gas or fuel provider billing
Fleet	Fuel use (litres)	Gas bills and records, e.g. Gas station receipts, fuel account records.
Travel	Kilometres traveled (km)	Travel records, receipts, vouchers

8.1.2 2.0 British Columbia Inventory Boundaries

Traditional Services:

Administration and Governance	Buildings and other structures	Vehicles, Equipment and Machinery
Drinking, Storm and Waste water	Buildings and other structures	Vehicles, Equipment and Machinery
Solid Waste Collection, Transportation and Diversion	Buildings and other structures	Vehicles, Equipment and Machinery
Roads and Traffic Operations	Buildings and other structures	Vehicles, Equipment and Machinery
Arts, Recreation, Parks and Cultural Services	Buildings and other structures	Vehicles, Equipment and Machinery
Fire Protection	Buildings and other structures	Vehicles, Equipment and Machinery

* A municipal corporate inventory must include contracted services and emissions from co-owned facilities. Local governments are required to report their percentage of ownership, and then are responsible to include that percentage of energy-use and emissions in the inventory.

* A municipal corporate inventory must include all services that fall within the six Traditional Services categories that are owned and operated by the municipal government, all contractors, and subsidiaries.

* This tool allows for additional entries outside the provincially defined scope. There is a travel category to include employee business travel (by land, air or water). There is also a miscellaneous category to include other activities outside the provincial scope such as paper use.

8.1.3 3.0 About the Tool

8.1.3.1 3.1 Enable Your Macros

You must enable Excel macros to use this tool effectively. To do this, click on 'Tools' --> 'Macro' --> 'Security'. Then select the 'Medium' setting. Excel needs to start up in this mode so please close down all Excel applications and re-open (with Security set to 'Medium').

8.1.3.2 3.2 What this Tool Will Do

The tool will quantify greenhouse gas emissions resulting from electricity use, heat generation, employee business travel, and other emissions sources as specified on the Miscellaneous tab. Users that have quantified GHG emissions from other sources have the option of adding in these amounts under 'Miscellaneous', and these GHG emissions will then be included in the Emissions Summary.

8.1.3.3 3.3 Navigating the Tool

Be sure you've collected all of the necessary data as explained in section 1.0 above. You will create a new inventory for each year using the 'Navigation' tab of this worksheet. You may not be able to see this tab yet, as it will only be activated once you have fully read this sheet to the end. There are grey macro-enabled buttons throughout the tool. The functions of these buttons are listed on them and can be clicked on to enable the desired function. Once you create a new inventory a tab will be created with the inventory year as its name. This tab is used for data entry and for displaying summary charts for that particular year. The 'Historical' tab is where current and past inventory data is stored. This tab allows you to view trends in GHG emissions, energy use and cost over time. Be sure to select your base year at the top and click on the 'Update Charts' button.

8.1.3.4 3.4 Entering Your Data

As mentioned above, once you create a new inventory a tab will be created with the inventory year as its name.

- At the top of this sheet be sure to enter your name and contact information as well as the start month and end month of the inventory.
- The next section to fill in is the electricity grid emission factor. This box is dynamic and is attached to only one year's inventory. This was done so that the tool is very flexible over time since electricity emissions factors change from year to year. A good source for this factor is BC Hydro or Environment Canada. Make sure that the electricity emissions factor is consistent with the BC Climate Action Secretariat for reporting purposes. The BC Climate Action Secretariat currently is using the BC Hydro electricity emissions factor.

The charts and summary tables you will see should be blank, as there is no data entered yet.

Enter your data into the following categories into the tool: Buildings (includes facilities and infrastructure), Fleet Vehicles, Travel-Air, Travel-Road, Travel-Water and Miscellaneous.

- Buildings and Fleet vehicles are required to be reported to the province, while the travel and miscellaneous sections are optional.
- Example data is shown in the grey cells at the top of each data entry chart. Enter your data into the white cells below this. Use the drop-down menus to select the units or type of data entered.

As you enter data the graphs and summary tables will begin to populate. Once complete, take a look at your annual summary charts to see where your city's emissions are the greatest.

The 'Factors' tab lists all of the data sources used in the tool (as described in 3.5 below).

The 'Conversions' tab can be helpful if you want to convert your data from one unit to another. Play around with it and see if it might be useful to you!

8.1.3.5 3.5 Data Sources

The GHG emission factors used in this tool have been collected from publicly available sources. They come from a combination of sources including Environment Canada's National Inventory Report 1990-2006, GHG Protocol for transportation and refrigerants and Corinair's Emission Inventory Guidebook 2006. These GHG factors can be viewed on the 'Factors' worksheet for interested parties.

All calculations will reference factors on the 'Factors' worksheet EXCEPT the BC electricity factor. This must be entered on each annual inventory sheet. The updated BC Hydro electricity factor can be obtained online from BC Hydro at:

http://www.bchydro.com/about/company_information/reports/gri_index/f2009_environmental_EN16_2.html.

8.1.4 4.0 Definitions

GHG – Greenhouse Gas Emissions

LPG – Liquid Petroleum Gases

GNG – Compressed Natural Gas

Heavy Fuel Oil – obtained from petroleum distillation and sometimes known as 'residual fuel oil'

Light Fuel Oil – obtained from petroleum distillation and sometimes known as 'distillate fuel oils'

kWh – kilowatt hour

l – Litre

tonnes CO₂e – tonnes of carbon dioxide equivalent

GJ – Gigajoules

8.1.5 5.0 Pembina Operational Recommendations

Make backup copies of this file regularly. Should this file be corrupted, all of the information you've entered will be lost including for previous years data entered. If multiple copies are on file, you will only need to restore most recent data.

Photocopies or digital copies of bills and records should be kept on file by the administrator of this program for your municipality. The purpose of which is to have hard copies available when needed. Print these on recycled paper.

8.2 Appendix 2 – Ministry of Community Development Carbon Neutral Scope

CARBON NEUTRAL LOCAL GOVERNMENT

Scope Document – 2010-5-07

1. GREENHOUSE GAS COVERAGE	
IN SCOPE	OUT OF SCOPE
<p>Six gases:</p> <ul style="list-style-type: none"> • Carbon dioxide – CO₂ • Methane – CH₄ • Nitrous oxide – N₂O • Sulphur Hexafluoride– SF₆ • Per fluorocarbons – PFCs • Hydro fluorocarbons – HFCs 	<p>All other gases not considered GHGs</p>
2. GEOGRAPHIC BOUNDARIES	
IN SCOPE	OUT OF SCOPE
<p>Emissions from Local Government (LG) operations located in British Columbia.</p>	<p>Emissions from LG operations outside of British Columbia.</p>
3. ORGANIZATIONAL BOUNDARIES	
IN SCOPE	OUT OF SCOPE
<p>a) Traditional Local Government Services</p> <p>Emissions from LGs that:</p> <ul style="list-style-type: none"> • are parties to the Climate Action Charter; and • provide any of the following traditional services: <ul style="list-style-type: none"> ○ Administration and Governance ○ Drinking, Storm and Waste Water ○ Solid Waste Collection, Transportation and Diversion ○ Roads and Traffic Operations/Maintenance ○ Arts, Recreation and Cultural Services ○ Fire Protection 	<p>a) Other Local Government Services</p> <p>Emissions from LGs that are not parties to the Climate Action Charter.</p> <p>Emissions from:</p> <ul style="list-style-type: none"> ○ Landfill ○ Transit services ○ Police Services ○ New construction (facilities, roads, etc.) ○ Primary power generation ○ Social housing ○ Tree farms ○ Community Sources (e.g., residential sources)

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4. ORGANIZATIONAL BOUNDARIES (cont'd)	
IN SCOPE	OUT OF SCOPE
<p>b) Subsidiary Organizations and Shared Services:</p> <ul style="list-style-type: none"> • Emissions related to a traditional service provided by a subsidiary organization or through a shared service agreement that is either fully consolidated or consolidated on a modified equity basis, are included in the local government's carbon neutral operations. • For those organizations that are included in the financial statements on a proportional consolidation basis, the local government can include a proportionate share of the emissions related to a traditional service operated by the organization, using the same proportion for emissions as are used for financial statement purposes, or as otherwise agreed to by the parties who share a proportional responsibility for the service. 	
5. OPERATIONAL BOUNDARIES	
5.1 STATIONARY SOURCES (buildings, structures, and related equipment/machinery)	
IN SCOPE	OUT OF SCOPE
<p>a) Direct emissions or indirect energy emissions from stationary sources used to provide traditional services.</p> <ul style="list-style-type: none"> • Direct emissions include those from the use of fossil fuels (e.g., natural gas, heating oil, propane) for heating space and water or producing steam. • Indirect energy emissions include those from electricity, hot water, steam etc. purchased from a third party (e.g., BC Hydro). 	<p>a) Direct or indirect energy emissions from stationary sources owned by the Province of BC or a public sector organization who would be required to include the building's emissions as part of its carbon neutral requirement. For example, the Province is responsible for the emissions from the Vancouver Art Gallery and as such the City of Vancouver will not include those emissions in its corporate footprint.</p>
<p>b) Direct emissions released unintentionally (fugitive emissions) from stationary sources used to provide traditional services. For example: HFCs from cooling units in arenas.</p>	<p>b) Fugitive emissions from transmission lines.</p>

5.3 MOBILE SOURCES (vehicle, park maintenance equipment, etc.)	
IN SCOPE	OUT OF SCOPE
<p>c) Direct emissions from:</p> <ul style="list-style-type: none"> • fleet vehicles and other mobile combustion sources used to provide traditional services; and • employee use of personal vehicles in the provision of traditional services (e.g., building inspection). <p>These emissions generally involve the mobile combustion of gasoline, diesel, propane, biofuel blends, etc.</p>	<p>c) Emissions from:</p> <ul style="list-style-type: none"> • transit buses • vehicle air conditioning (i.e., fugitive HFC emissions) • employee use of commercial transport (e.g., intercity air/train/bus; vehicle rentals; taxi).
5.4 CONTRACTED SERVICES	
IN SCOPE	OUT OF SCOPE
<p>d) Direct emissions from mobile sources which are used by contractors to provide traditional services.</p>	<p>d) Emissions associated with:</p> <ul style="list-style-type: none"> • a contractor's corporate offices • travel to and from the contractor's offices
5.5 PROCUREMENT	
IN SCOPE	OUT OF SCOPE
	<p>e) Indirect emissions associated with purchased office paper.</p>

8.3 Appendix 3 – Action Planning Assumptions

Assumptions

Community Growth per year (%) 0.92

Emissions Factors

Electricity emissions factor (g CO₂e/kWh) 28

Natural gas factor (g CO₂e/GJ) 0.0497

gasoline factor for passenger vehicles (g CO₂e/L) 2385

diesel factor for commercial vehicles (g CO₂e/L) 2691

B5 Biodiesel factor (g CO₂e/L) 2543.8

B20 biodiesel factor (g CO₂e/L) 2102

Waste Water

Total electricity consumption from Normwood Facility (kWh) 1988400

Building electricity consumption attributed to blowers (%) 0.8

Efficiency improvement due to blower upgrade (%) 0.3

Lighting

Energy reduction potential of adaptive street lighting (kWh/year) 82400

Anti-idling

Total GHGs for Campbell River fleet 782

Reduction potential from anti-idling program (%) 0.05

Reduction potential from anti-idling and driver training program (%) 0.1

Biodiesel

Total diesel consumption per year (L) 229734

Electric Vehicles

Total gasoline consumption per year (L) 11934

Geo-exchange

Total natural gas consumption from the community centre (GJ) 1342.7

Community centre heating consumption from geexchange pump (kWh) 124454